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ABSTRACT

This teaching guide consists of two short lessons: (1)"Centuries and Millennia"; and (2) "Days, Weeks, Months and Years." The first lesson shows major religious and secular concerns that, in various ages, combined to produce the calendar that now indicates the beginning of "a new millennium." It is specifically designed to combat "calendar occultism," the irrational belief that mystical powers are associated with numbers. The second lesson focuses on the mathematical "messiness" of the earth's journey around the sun (and the moon's "monthly" trip around the earth). The complex interplay of physical phenomena, religion, and science is an interdisciplinary lesson. The heavily footnoted text, along with the ending "Notes for Teachers," provides the basis for verbal commentary. A multiple-choice quiz also is included. (BT)

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ED 431 680

# Calendars and Thinking Logically

Thirty days hath September
**(which is not the 7th month)**

April, June and November
**(which is not the 9th month)**

All the rest have 31

**Except for February with 28**

**Except for the normal leap years**

**Except for end-of-century leap years**

**Except for centuries divisible by four**

Except for the seconds

SO 030 818

Fred C. Smith
Brant Abrahamson

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# Preface

*Calendars and Thinking Logically* consists of two short and, we hope, enlightening lessons. These are "Centuries and Millennia" and "Days, Weeks, Months and Years." The first shows major religious and secular concerns that, in various ages, combined to produce the calendar that now indicates we are about to begin "a new millennium." Quite specifically, it is designed to combat "calendar occultism"--the irrational belief that mystical powers are associated with numbers. "Days, Weeks, Months and Years" focuses on the mathematical "messiness" of the earth's journey around the sun (and the moon's "monthly" trip around the earth). The complex interplay of physical phenomena, religion and science is an exciting interdisciplinary lesson.

The booklet is divided into two sections. The first six pages make up the Student Text *that we encourage you to take out and photocopy for your learners*. The dual page-numbering system assumes it will be removed. The remaining 12 pages are the Teacher's Manual. The text is repeated, but it is heavily footnoted. These footnotes along with the ending "Notes for Teachers" provide the basis for verbal commentary. You'll also find a multiple-choice quiz, but we believe that essays best enable students to display their "considered thought."

*Calendars and Thinking Logically* **(copyright © 1999)** is designed to be the basis for a one or two period study session. It is, therefore, an effective "emergency" lesson. Even short or emergency materials, we believe, should be based upon established scholarship. Students must believe all their learning has some long-term significance to understand why they should study hard.

Brant Abrahamson, Director

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We hope this mini-lesson will encourage you to examine our more inclusive units. Each is designed to be taught over a two-to-four week (one-hour) period. All, we believe, will heighten an adolescent's or young adult's intellectual sophistication, moral development and community concern. To secure detailed information contact:

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## Part One: Centuries and Millennia

**Introduction.** "What year is it?" Most Americans--even quite young children--can almost immediately answer this question. They wouldn't ponder because our calendar is taken for granted. We "naturally" use it to determine schedules, calculate age, make loan payments and plan for the future. As we become educated we expand our historical horizons and understand that our calendar had a "starting point" about 2,000 years ago. We know that from this starting point most people count forward in "A.D." times and backward in "B.C." eras.

Further, we understand that other calendars exist. Most know of the age-old Chinese calendar. We're annually reminded of it during Chinese New Year celebrations. We learn that they celebrate the "Year of the Rabbit" (1999) and other creatures in a twelve-year cycle that extends back more than 5,000 years. If we are followers of Islam or have studied the faith, we know the Muslim calendar begins with Muhammad's flight from Mecca to Medina in 622 A.D. (by "our" calendar).

Despite this intellectual understanding that a calendar is a human tool, many folks have superstitious beliefs linked to it. They see specific dates (days and years) as having magical powers in the same way they view four-leaf clovers or broken mirrors.

One frequent scary time is Friday the 13th of any month. Another that seems especially frightful right now has to do with the year 2,000 A.D. These fears go far beyond the so-called Y2K two digit computer problems currently being corrected. So, what's the origin of the calendar that says the current year is number "1999"? Would people with occult-type beliefs about the "year 2000"--the "New Millennium"--be so concerned if they knew how this numbering of years came about? We'll see.

**Origins of our Calendar.** Generally speaking, people link their calendar to some important event in their history. The Chinese calendar is linked to what they believed to be the first Chinese Dynasty, and Muslims use an event in Muhammad's life. Much the same thing happened in Christian Europe.

Our way of numbering years was created around 1,470 years ago. Before this, the "Julian" calendar was used in the Roman Empire. Julius Caesar knew the existing system had flaws, and he wanted to develop a more accurate calendar. When he defeated Pompey's forces in Egypt (46 B.C.), he linked up with Cleopatra who was an intelligent and educated woman. She told him of her country's superior ways of measuring time, and had one of Egypt's expert astronomers meet with them. After returning to Rome, Julius Caesar started his reform based on what he had learned.

Caesar's new calendar had a cycle of three 365-day years followed by a fourth year of 366-days--the "leap year." The starting point of his calendar--the Julian calendar--retained the (legendary) founding of the city of Rome centuries before. It went into effect in 709 a.u.c. (*ab urbe condita*--from the city's founding).

Much later--after Christianity was made a state religion in the Roman Empire under Constantine (324-337 A.D.)--Christians began to want calendar years that referred to something of religious significance to them. The critical event for "our" calendar occurred about 200 years after Constantine--when Pope John I asked Dionysius Exiguus to determine when Easter celebrations would be held in the coming decades. This was a difficult task since it involved the moon's phases coordinated to solar years. Dionysius, a Church abbot, was selected because he was trained in mathematics and astronomy. He started work on his calendar of Easters in (what would be) 525 A.D.

The calendar that emerged--our basic system for numbering years--included the Julian calendar's 12 months and Constantine's 7-day weeks. It was the product of Church politics along with Dionysius's scholarship and guesswork.

The politics involved its starting point. Some Christians of Dionysius' time already were using a "Years of the Martyrs" calendar commemorating their last great Roman persecution under Emperor Diocletian. It was called the *"anno Diocletiani"* calendar, and its dating started when Diocletian became emperor in (what would be) 284 A.D.

Other Christians wanted the calendar based on Jesus' life. By Dionysius' time, most believed Jesus had been born divine, so basing the Church calendar on his birth made sense to them. It was a fundamentally important religious time.

However, fixing a date for the birth of Jesus was difficult. New Testament authors would have known of Roman and Jewish calendars, but these writers give no dates. Perhaps they thought dating was insignificant. Most believed that the existing times were about to end, and the "Millennium" was near--when Jesus would return and rule the world. Probably they didn't know when Jesus had been born since the earliest Gospel accounts of the birth were written more than 80 years later.

At any rate, Dionysius calculated that Jesus was born 525 years before the time that Pope John I asked him to make the calendar of Easters. That placed Jesus' birth close to the beginning of the Roman year 754 *a.u.c.* Dionysius's first "year of the Lord" (Year One *anno Domini*--1 A.D.) corresponded to the Roman year 754 *a.u.c.*

Apparently there was a lapse in Biblical scholarship. The authors of the Matthew and Luke Gospels state that Herod was King of Judea at Jesus' birth, and Herod's death turned out to have been 750 *a.u.c.* According to these Gospels, therefore, Jesus had to have been born over four years before the 1 A.D. date.

In addition, the Matthew author says that King Herod was afraid of the baby Jesus and ordered male children two years and younger in the area to be killed. (Mary, Joseph and Jesus escaped by going to Egypt according to the account.) If accepted as history, Jesus may have been born nearly two years prior to Herod's death. This is why church historians say Jesus's birth was between 4 and 6 years "Before Christ."

Christians gradually accepted the "A.D." calendar over the next few hundred years. It became the basis for dating religious celebrations and secular events. When the

errors in figuring Jesus's birth were realized, it seemed too late to correct them. Most people were unconcerned anyway. Their lives weren't affected very much.

**The "Year One" Problem.** Dionysius began his calendar with the year one. He couldn't begin it with "0"--such as we use--because there is no zero in Roman numerals. Roman "numerals" are actually letters: I, II, III, IV, V, VI, VII, VIII, IX X, etc., along with L for fifty, C for a hundred, D for five hundred, M for a thousand. The first century had to start with *anno Domini 1* and end with C [100]. The second century thus began with the year 101 just as our 20th century began in 1901. As far as counting years is concerned, the 21st Century will begin in 2001.

"Arabic" numerals with the concept of zero were devised by Hindu/Indian scholars in South Asia sometime in the distant past. Arab Muslims brought them west and improved them, but they didn't become widespread in Europe until about the time of Christopher Columbus. What we write as 1000 A.D. was known then as the "M", or millennium year.

**The Present Day.** This brings us to our own "millennium times." Ancient Christian politics along with Dionysius' errors and calculation limitations are important to remember if religious significance is attached to the year 2000.

If we're measuring the time since Jesus was born--which Dionysius was trying to do--the third millennium already has begun! The "true" year 2000 A.D.--2000 years after the birth of Jesus--has already passed! If other groups of Christians had won the political battles, we wouldn't be "facing the millennium" at this time. It would be very far into the future if we were still using the *"anno Diocletiani"* calendar.

As you see, our calendar has no cosmic origin or significance. What we will call the year 2,000 is the result of a variety of almost accidental happenings. It was developed in chaotic times by Christians using Roman numerals who believed Jesus was the Christ--the world's savior--when he was born. But other notable times in early church history also were considered as starting points.

As a final note, this calendar is now used world-wide. Christian Europe's great political and economic power beginning about 1500 A.D. accounts for this fact.[1] As one might expect, many non-Christians find the B.C. ("Before Christ") and A.D. (*anno Domini* --"In the Year of Our Lord") symbols objectionable. As a result, there's been a gradual change to "C.E." (common or current era) and "B.C.E." (before the common era). The numbering system, though, is exactly the same. "B.P." (before the present time) also is used for very ancient dating.

[1] When other calendars are used--such as the Islamic calendar--the common era (C.E.) dates also are given.

## Part Two: Days, Weeks, Months and Years

**The "365 Day" Issue**. Dionysius' "A.D." calendar continued to use Julius Caesar's system of having three periods of 365 days each followed by a fourth "Leap Year." This system worked okay for quite a while, but a solar year is about 11 minutes shorter than 365.25 days. The earth completes its orbit around the sun, but the Julian calendar is not quite over! As the years pass, the "left over" minutes become left over hours. After several hundred years the calendar was off by days! Real solstices and equinoxes came before their designated calendar dates. What to do?

Finally, in 1582--about a thousand years after Dionysius--a correction was devised. A committee of European experts who had been working on the problem convinced Pope Gregory XIII to use his power to correct things. They succeeded. In 1582 Gregory decreed a 10-day skip--from October 5 to October 15--so the calendar would have solstices and equinoxes in accord with astronomic observations.

The committee also "fine tuned" the Leap Year rule. The extra day (February 29) wouldn't be added in century "double zero" years--except when divisible by 400. For example, the year 1600 was divisible by 400 so it was a Leap Year, but not 1700, 1800 or 1900. Year 2000 will have a February 29 as did 1600. This keeps the calendar accurate in the long run. It's now off by an average of only seconds per year, and there are rules for that.

Our calendar is sometimes called the "Gregorian calendar" since it was adjusted by experts at the time of Pope Gregory XIII. But like Dionysius's calendar, it took some time for the Gregorian revisions to be widely accepted even in many Christian lands.

The Protestant Reformation was taking place, and these leaders wouldn't accept decrees from the Roman Pope. For instance, the English (Church of England) were battling Catholic Spain and France. English-controlled lands--America included--refused to officially accept the Gregorian calendar.[1] When change finally came in 1752, their old calendar was 11 days behind. To catch up, all days between September 2nd and September 14th, 1752 were omitted. This was during George Washington's time, and he was born on February 11th, 1731 by the existing "old style" calendar. The Feb. 22nd birthday was calculated on the new calendar. Fortunately, corrections were made before the American Revolution. Otherwise, July 4, 1776, wouldn't be July 4th today!

Russia continued the old system until after the Communists took over. The Czars and most Russians belonged to the Orthodox Christian Church which historically looked to Constantinople for leadership, not Catholic Rome. The two branches of the church had grown apart and split in 1054 A.D. Russians--like western Protestants--rejected

[1] In practice, many colonists and English merchants did use the Gregorian calendar. They designated dates as "O.S." for old style and "N.S." for new style.

the "Pope's calendar" and continued to do so as long as the Czars ruled. Therefore, when Lenin and his Communist Party staged their 1917 "October Revolution", it was by the old calendar--as Washington's birthday had been. When they later adopted the Gregorian calendar, they had to celebrate their "October Revolution" in November!

**Months.** The cycle of years is determined by the earth's position relative to the sun. A solar year is one earth-orbit around the sun. There are two solstices and two equinoxes.[1] Even early peoples who believed the earth was stationary--with the sun, moon, planets, and stars revolving around it--observed solar years, and they divided them up in various ways. Our month and week divisions are one way of doing this. These are arbitrary, or human-made.

After Julius Caesar's calendar reform, Romans had a 12-month year with the odd circumstance that the ending "numbered months" were different from their numbers! September (from the Latin word for seven) had become the 9th month, October (8) had become the 10th month, November (9) was the 11th, and December (10) was the 12th. It happened this way: March originally had been the first month of a 10-month year. Then there was a switch to twelve months with January and February added; the year still beginning in March (although not March Ist). The Julian calendar changed when the "new year" would begin. It now started with January. This left September, October, November and December as numbered months not corresponding to their numbers. Apparently the Romans (including Dionysius) weren't bothered by this oddity, and we aren't either.

Are these ancient flip-flops important? Well, we do continue to abide by them. More important perhaps, they provide abundant evidence that calendars are human-made things based upon very human considerations, calculations and errors.

**A Week and its Days.** The seven-day week system was ancient even when Julius Caesar ruled. Originally it may have been a crude division of the moon's cycle (of 29 days, 12 hours, 44 minutes, 2.8 seconds). Or, it may have come from ancient astrology. The names of days in Mediterranean cultures east through Mesopotamia all refer to the gods of the solar system bodies people could see. In whatever language, these were deities associated with the sun, moon, Mars, Mercury, Jupiter, Venus and Saturn.

Emperor Constantine (324 to 337 A.D.) formalized Sunday as the first day of the 7-day week largely for political reasons. Sol--the sun--was still worshiped by many Romans. Constantine pleased these people as well as Christians. According to Biblical accounts, Jesus "was crucified on the sixth day of the Jewish week and rose from the dead on the first day of the next week--a Sunday." As a consequence, for a long time Christians had gathered together on this day to share a meal, the Eucharist.

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[1] An equinox is when the sun is passes over the equator. All days and nights are equal in length. A Solstice is when the sun is as "far south" or as "far north" as it gets. Note that these folksaying definitions come from a time when it was commonly believed that the sun circled the earth. "Sun rise" and "sun set" phrases are in the same category.



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Our names for the days of the week are Anglo-Saxon words for solar-system gods. Is this another oddity? One might think Christian leaders would have been unhappy about continuing to honor old "pagan" deities. However, from earliest times they accommodated practices of other cultures to gain acceptance and make conversions.

## Part One: Questions and Projects

1. When will you celebrate the new millennium? Why then? What will you tell a person who fears it? Will this reading help you make your explanations?
2. What year would it be now if *"anno Diocletiani"* calendar supporters had won?
3. When writing history essays, will you use "B.C./A.D" or "B.C.E./C.E."? Why?
4. What elements of our calendar's history surprise you the most?
5. Determine the number of current year based upon another calendar.
6. Investigate the Chinese calendar, or one from another culture. How was it kept in sync with the solar year? How is the date for a major cultural or religious celebration--such as Passover (Judaism) or Ramadan (Islam)--determined?
7. What is "the millennium" in Christian belief? Does it specifically relate to the year 2000 A.D.? Why, or why not?

## Part Two: Questions and Projects

1. How many months are in the Jewish calendar? The Islamic calendar? How was the Julian calendar's "minutes then hours then days ahead" problem avoided by these calendars?
2. What are the names of the months and weeks in Spanish or some other language? Interview a friend or relative who speaks the language. Do they have the same origin as in English?
3. People also group calendar years. We use decades, centuries and millennia. Does it make sense to organize history by years ending with zeros? Is our historical understanding helped by talking about life "in the 60's"--as if 1960-69 were a distinct historical period? Is our understanding of historical situations and cultural periods distorted by using "round numbers" in this way? Or, are they necessary if we are to remember things at all? Do we attribute mystical significance to them?
4. Why was no one in England or her American colonies born between September 2nd and 14th, 1752? Were people in France and Spain born between these dates? Did George Washington really lose days out of his life?
5. Why was there resistance to the Gregorian calendar? Where did it last the longest?
6. Think of "Friday the 13th." Is the time fearful to anyone you know? Does it affect their behavior? How can such fears be overcome?

**Sources**: Most of the following is based on material from David Ewing Duncan's book *Calendar: Humanity's Epic Struggle to Determine a True and Accurate Year* (Avon, 1998) and Stephen Jay Gould's book *Questioning the Millennium: A Rationalist's Guide to a Precisely Arbitrary Countdown* (Harmony Books, 1997).

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However, fixing a date for the birth of Jesus was difficult. New Testament authors would have known of Roman and Jewish calendars, but these writers give no dates.

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[1] Julius Caesar would have used Roman numerals rather than the Arabic numerals, however. Arabic numbers originated in India and were brought into Europe at a much later time.

[2] The set of calculations being used had about expired, and a new one was needed.

[3] In present-day Western Christianity, Easter is the first Sunday after the first full moon after the vernal (spring) equinox. Easter follows the Jewish Passover in the Eastern Orthodox Christian Church, and it is based upon the Jewish calendar.

[4] The first Christians did not necessarily believe that Jesus was divine when he was born. This belief gained acceptance only during the second half of the first century A.D. Earlier Christians thought Jesus became divine when, in their minds, he was resurrected from the dead. Paul of Tarsus (St. Paul) apparently had this view. Others thought he became divine when he was baptized by John.

Perhaps they thought dating was insignificant. Most believed that the existing times were about to end, and the "Millennium" was near--when Jesus would return and rule the world. Probably they didn't know when Jesus had been born since the earliest Gospel accounts of the birth were written more than 80 years later.

At any rate, Dionysius calculated that Jesus was born 525 years before the time that Pope John I asked him to make the calendar of Easters. That placed Jesus' birth close to the beginning of the Roman year 754 *a.u.c.* Dionysius's first "year of the Lord" (Year One *anno Domini*--1 A.D.) corresponded to the Roman year 754 *a.u.c.*

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**The "Year One" Problem.** Dionysius began his calendar with the year one. He couldn't begin it with "0"--such as we use--because there is no zero in Roman numerals. Roman "numerals" are actually letters: I, II, III, IV, V, VI, VII, VIII, IX, X, along with L for fifty, C for a hundred, D for five hundred, M for a thousand. The first century had to start with *anno Domini I* and end with C [100]. The second century thus began with the year 101 just as our 20th century began in 1901. As far as counting years is concerned, the 21st Century will begin in 2001.

"Arabic" numerals with the concept of zero were devised by Hindu/Indian scholars in South Asia sometime in the distant past. Arab Muslims brought them west and improved them,[2] but they didn't become widespread in Europe until about the time of Christopher Columbus. What we write as 1000 A.D. was known then as the "M", or millennium year.

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1 "When the Gospel stories of Jesus' birth were written, probably in the middle to late years of the ninth decade of the common era, no one knew his parents, much less the details of his birth." From *Why Christianity Must Change or Die* by John Shelby Spong (1998, San Francisco: Harper), page 110.

2 Arab scholars were probably the first to use zero as a positional notation so that, for example, the Roman numeral CCMIV could be written as 804. Some Europeans were still combining the two numbering system in Columbus' time, so that 1502 might be written as M5C2.

**The Present Day.** This brings us to our own "millennium times." Ancient Christian politics along with Dionysius's errors and calculation limitations are important to remember if religious significance is attached to the year 2000.

If we're measuring the time since Jesus was born--which Dionysius was trying to do--the third millennium already has begun! The "true" year 2000 A.D.--2000 years after the birth of Jesus--has already passed! If other groups of Christians had won the political battles, we wouldn't be "facing the millennium" at this time. It would be very far into the future if we were still using the *"anno Diocletiani"* calendar.[1]

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As a final note, this calendar is now used world-wide. Christian Europe's great political and economic power beginning about 1500 A.D. accounts for this fact.[2] As one might expect, many non-Christians find the B.C. ("Before Christ") and A.D. (*anno Domini* --"In the Year of Our Lord") symbols objectionable. As a result, there's been a gradual change to "C.E." (common or current era) and "B.C.E." (before the common era). The numbering system, though, is exactly the same. "B.P." (before the present time) also is used for very ancient dating.

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[1] Coptic Christians in Egypt continue to use the *anno Diocletiani* calendar. For them, our 2000 A.D. is 1716 in the "Era of the Martyrs." (Duncan, p. 75)

[2] When other calendars are used--such as the Islamic calendar--the common era (C.E.) dates also are given.

## Part Two: Days, Weeks, Months and Years

**The "365 Day" Issue**. Dionysius' "A.D." calendar continued to use Julius Caesar's system of having three periods of 365 days each followed by a fourth "Leap Year." This system worked okay for quite a while, but a solar year is about 11 minutes shorter than 365.25 days. The earth completes its orbit around the sun, but the Julian calendar is not quite over! As the years pass, the "left over" minutes become left over hours. After several hundred years the calendar was off by days! Real solstices and equinoxes came before their designated calendar dates. What to do?

Finally, in 1582--about a thousand years after Dionysius--a correction was devised. A committee of European experts who had been working on the problem convinced Pope Gregory XIII to use his power to correct things. They succeeded. In 1582 Gregory decreed a 10-day skip--from October 5 to October 15--so the calendar would have solstices and equinoxes in accord with astronomic observations.

The committee also "fine tuned" the Leap Year rule. The extra day (February 29) wouldn't be added in century "double zero" years--except when divisible by 400. For example, the year 1600 was divisible by 400 so it was a Leap Year, but not 1700, 1800 or 1900. Year 2000 will have a February 29 as did 1600. This keeps the calendar accurate in the long run. It's now off by an average of only seconds per year, and there are rules for that.[1]

Our calendar is sometimes called the "Gregorian calendar" since it was adjusted by experts at the time of Pope Gregory XIII. But like Dionysius's calendar, it took some time for the Gregorian revisions to be widely accepted even in many Christian lands.

The Protestant Reformation was taking place, and these leaders wouldn't accept decrees from the Roman Pope. For instance, the English (Church of England) were battling Catholic Spain and France. English-controlled lands--America included--refused to officially accept the Gregorian calendar.[2] When change finally came in 1752, their old calendar was <u>11 days</u> behind. To catch up, all days between September 2nd and September 14th, 1752 were omitted. This was during George Washington's time, and he was born on February 11th, 1731 by the existing "old style" calendar. The Feb. 22nd birthday was calculated on the new calendar. Fortunately, corrections were made before the American Revolution. Otherwise, July 4, 1776, wouldn't be July 4th today!

Russia continued the old system until after the Communists took over. The Czars and most Russians belonged to the Orthodox Christian Church which historically looked to <u>Constantinople for leadership</u>, not Catholic Rome. The two branches of the church

[1] A particular year may be off by <u>more than seconds</u> because corrections are made only periodically.

[2] In practice, many colonists and English merchants did use the Gregorian calendar. They designated dates as "O.S." for old style and "N.S." for new style.

had grown apart and split in 1054 A.D. Russians--like western Protestants--rejected the "Pope's calendar" and continued to do so as long as the Czars ruled. Therefore, when Lenin and his Communist Party staged their 1917 "October Revolution", it was by the old calendar--as Washington's birthday had been. When they later adopted the Gregorian calendar, they had to celebrate their "October Revolution" in November! [1]

**Months.** The cycle of years is determined by the earth's position relative to the sun. A solar year is one earth-orbit around the sun. There are two solstices and two equinoxes.[2] Even early peoples who believed the earth was stationary--with the sun, moon, planets, and stars revolving around it--observed solar years, and they divided them up in various ways. Our month and week divisions are one way of doing this. These are arbitrary, or human-made.

After Julius Caesar's calendar reform, Romans had a 12-month year with the odd circumstance that the ending "numbered months" were different from their numbers! September (from the Latin word for seven) had become the 9th month, October (8) had become the 10th month, November (9) was the 11th, and December (10) was the 12th. It happened this way: March originally had been the first month of a 10-month year. Then there was a switch to twelve months with January and February added; the year still beginning in March (although not March 1st). The Julian calendar changed when the "new year" began; it now started with January. This left September, October, November and December as numbered months not corresponding to their numbers. Apparently the Romans (including Dionysius) weren't bothered by this oddity, and we aren't either.

Are these ancient flip-flops important? Well, we do continue to abide by them. More important perhaps, they provide abundant evidence that calendars are human-made things based upon very human considerations, calculations and errors.[3]

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[1] Members of the Orthodox Christian church in Russia continue to use the old calendar for religious purposes. They celebrate Christmas on January 7th. Most Orthodox Christians in the United States celebrate Christmas on December 25th using a "revised Julian" calendar that follows the Gregorian dating system--except for Easter. In all Orthodox Churches, Easter must follow the Jewish Passover.

[2] An equinox is when the sun is passes over the equator. All days and nights are equal in length. A Solstice is when the sun is as "far south" or as "far north" as it gets. Note that these folksaying definitions come from a time when it was commonly believed that the sun circled the earth. "Sun rise" and "sun set" phrases are in the same category.

[3] The number of days in each of the months also illustrates the kinds of happenstance by which our calendar was created. Caesar alternated the days during leap years--31 for January, 30 for February, 31 for March, etc. For the 365 day years, February was dropped to 29. When Augustus was Emperor, the sixth month was named for him because the fifth month's name had been changed to honor Julius Caesar. Since Caesar's month had 31 days, they decided that Augustus' month had to have 31 days also. So, another day was taken from February, with alternating days of September through December changed.

**A Week and its Days.** The seven-day week system was ancient even when Julius Caesar ruled. Originally it may have been a crude division of the moon's cycle (of 29 days, 12 hours, 44 minutes, 2.8 seconds). Or, it may have come from ancient astrology. The names of days in Mediterranean cultures east through Mesopotamia all refer to the gods of the solar system bodies people could see. In whatever language, these were deities associated with the sun, moon, Mars, Mercury, Jupiter, Venus and Saturn.

Emperor Constantine (324 to 337 A.D.) formalized Sunday as the first day of the 7-day week largely for political reasons. Sol--the sun--was still worshiped by many Romans.[1] Constantine pleased these people as well as Christians. According to Biblical accounts, Jesus "was crucified on the sixth day of the Jewish week and rose from the dead on the first day of the next week--a Sunday." As a consequence, for a long time Christians had gathered together on this day to share a meal, the Eucharist.[2]

Our names for the days of the week are Anglo-Saxon words for solar-system gods. Is this another oddity? One might think Christian leaders would have been unhappy about continuing to honor old "pagan" deities. However, from earliest times they were willing to accommodate customs and practices of other cultures to gain acceptance and make conversions. So, the names of these gods live on as:

| | |
|---|---|
| Sunday | (the sun worshipers' day) |
| Monday | (the Moon's day) |
| Tuesday | (Twi in Anglo-Saxon, the day for worshipers of the god of Mars) |
| Wednesday | (Woden - the planet Mercury god's day) |
| Thursday | (Thor - the planet Jupiter god's day) |
| Friday | (Freya - the planet Venus goddess's day) |
| Saturday | (Saturn - Seterne, the planet Saturn god's day) |

**Questions and Projects**

1. How many months are in the Jewish calendar? The Islamic calendar? How was the Julian calendar's "minutes then hours then days ahead" problem avoided by these calendars?
2. What are the names of the months and weeks in Spanish or some other language? Interview a friend or relative who speaks the language. Do they have the same origin as in English?
3. People also group calendar years. We use decades, centuries and milliennia. Does it make sense to organize history by years ending with zeros? Is our historical understanding helped by talking about life "in the 60's"--as if 1960-69 were a distinct historical period? Is our understanding of historical situations and cultural

[1] The sun god was Mithras, and Mithraism (originating in Persia) was a major religion during Constantine's time. It was a big challenge to Christianity--as it had been during the previous two centuries.

[2] (Duncan, p. 44) Very early Christians had followed Jewish Sabbath-day worship traditions.

periods distorted by using "round numbers" in this way? Or, are they necessary if we are to remember things at all? Do we attribute mystical significance to them?
4. Why was no one in England or her American colonies born between September 2nd and 14th, 1752? Were people in France and Spain born between these dates? Did George Washington really lose days out of his life?
5. Why was there resistance to the Gregorian calendar? Where did it last the longest?
6. Think of "Friday the 13th." Is the time fearful to anyone you know? Does it affect their behavior? How can such fears be overcome?

**Notes for Teachers**

1. Most people will celebrate the beginning of the "21st century" on Jan. Ist, 2000 A.D. as determined by the Gregorian calendar. This is a "democratic" social and political decision. At the end of previous centuries that were less influenced by popular culture, elite groups tended to favor mathematical "correctness."

2. One should not perpetuate the myth that Rome "fell" at some point after which there were "Dark Ages." For centuries there'd been Germanic invasions into Roman territories. Because of missionary work, many of these tribes already were Christian. Other tribal people had been Roman slaves or had served in Roman armies. In short, they were "Romanized" to some degree--not barbarians as this word is understood today. Theodoric I--who ruled at the time of Dionysius--had Germanic (Ostrogothic) heritage, but he'd been raised and educated in Constantinople, the capital of the Eastern Empire. Zeno, the Eastern emperor, supported him. True, Rome was in shambles, and Theodoric ruled from Ravenna--as had previous late Roman Emperors. However, he admired the Roman civilization. He repaired aqueducts to Rome and rebuilt parts of the city. He also tried to strengthen the state by eliminating Church divisions. He failed, but still things more-or-less held together for a while longer.[1]

3. After Dionysius' time, various scholars (monks, mostly) realized that calendar dates were departing more and more from actual solar years. But, they lacked the ability or power to correct things. Knowledge of complex fractions gradually had died out, and monks "tended to round off anything but a simple fraction such as one quarter or one half." At the same time, Church power increased. Few of the "computists dared challenge the Church on a matter so fundamental as measuring time." And those who did--such as Roger Bacon in the thirteenth century--were ignored. (Duncan, p.5)

4. "The millennium" refers to a new era on earth when, some Christians believe, Jesus will return to rule for a thousand years. Broadly speaking, Christian *millenarians*

[1] The Arian controversy was a continuing problem. It related to how Christians understood the nature of Jesus, and it had divided the Christian Church for more than 200 years. By this time, Arian Christians were losing out, but Theodoric and many of his Germanic subjects still believed in this "heresy." A simple statement of the controversy that began with Arius and Athanasius in about 320 A.D. is found in *A History of God* by Karen Armstrong (1993, NY: Ballantine Books). See Chapter 4, "Trinity: The Christian God."

today are divided into two groups. Premillenialists see worldly evil as increasing--which they interpret as a sign that end-times are near. They foresee a day coming relatively soon when Jesus will return. The dead will arise to be judged. The damned go to hell, and the saved will have a peaceful 1000 year rule under Christ. Postmillenialists hold that Christ will not come until after humans prepare the way. Some think there must be a "1000-year period of justice and peace prior to Christ's arrival."[1]

Christian after-life concepts are very diverse, and any short statement will neglect the views of various subdivisions. For instance, some believe that only the faithful will arise from the dead. For them, eternal extinction replaces punishment in hell. Roman Catholic doctrine includes purgatory where souls of believers go to make amends for their earthly sins before entering heaven. Generally, Protestants reject the purgatory concept. Founders of the Universalist Church[2] rejected the idea of hell, believing that all souls would go to heaven.

Large numbers of Christians are not millenarians. They see "afterlife" in non-earthly terms, and they don't attempt to describe what happens after death in specific terms. The New Testament Book of Revelations as interpreted by various millenarians is not central to their faith.

5. Discussion of calendar occultism--the magical qualities associated with particular dates--can be used as an introduction to a study of additional kinds of numerology and astrology. These include occult concepts related to such ideas as "propitious times" and "lucky numbers."

As an example, have students consider this news item. In New Delhi " 'Three out of every four deliveries [of new-born babies] at the hundreds of privately run maternity homes...are by Caesarian section,' Dr. Ruchira Gupta told Rome's Inner Press Service. ...More and more prospective parents are insisting on Caesareans to ensure delivery at precisely determined auspicious moments calculated by the family astrologer." (Matt Cherry, "Auspicious Deliveries," *Free Inquiry*, Vol. 19, no. 1, Winter, 1998/99, page 15).

In China, birth rates fluctuate with the calendar associations. More babies are born during "auspicious years" in the twelve-year cycle than in others.

Much lottery gambling is built--at least in part--upon people's belief that they have "lucky numbers."

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[1] See *Religion in Sociological Perspective* by Keith Roberts (1990, Belmont, CA: Wadsworth Publishing Co.), pages 241-45.

[2] The Universalist Church has combined with the Unitarians to form the Unitarian/Universalist Church that, as an organization, seeks insights from many religious traditions, not just Christianity.

## The year 2000 A.D. in other calendars is

| | |
|---|---|
| First Egyptian calendar | 6236 |
| Jewish calendar | 5760 |
| Mayan great cycle calendar | 5119 |
| Old Roman calendar | 2753 |
| Ancient Babylonian calendar | 2749 |
| Buddhist calendar | 2544 |
| Coptic Christian calendar | 1716 |
| Muslim calendar | 1420 |
| Persian calendar | 1378 |
| French Revolution calendar | 208 |

The Chinese year of the Dragon[1]

[1] Duncan, p. vii.

1. January Ist, 2000 A.D. is:
   a. Exactly 2000 years after Jesus was born.
   b. When major computer systems almost certainly will break down.
   c. When the "new millennium" will be celebrated throughout the world.
   d. Of great religious significance to Muslims.

2. The standard calendar in the United States is sometimes called the:
   a. Gregorian calendar.
   b. Julian calendar.
   c. Lunar calendar.
   d. "Years of the Martyrs" calendar.

3. Which of the following best describes why there are solstices as the earth travels around the sun? The earth:
   a. Is tilted on its axis.
   b. Spins on its axis.
   c. Has a moon with gravitational pull.
   d. Has seasonal changes.

4. When speaking of a "winter solstice" we must specify if we are talking about:
   a. Eastern or Western hemispheres.
   b. Northern or Southern hemispheres.
   c. A new or full moon phase.
   d. the Julian or Gregorian calendar.

5. The major reason our calendar came into world-wide use was because:
   a. The majority of people in the world today are Christians.
   b. Europeans overpowered many world cultures.
   c. It calculated the length of a solar year much more accurately than did any other calendars.
   d. It is based upon a singular cosmic event: the star over Bethlehem.

6. "600 B.C." is the same time period as:
   a. 600 *a.u.c.*
   b. 600 B. P.
   c. 600 B.C.E.
   d. 600 C. E.

7. Generally speaking very ancient people's calendars--except for the Egyptians--were based on:
   a. The North Star.
   b. Sun spots.
   c. Bird flights (leaving/returning).
   d. Moon phases.

8. Dionysius Exiguus did his calendar work near the:
   a. Beginning of the Roman Empire.
   b. Height of the Roman Empire.
   c. End of the Roman Empire.
   d. Time of Columbus.

9. He was most concerned about determining the correct dates for future religious celebrations relating to:
   a. The Roman sun god's solstice.
   b. The Christian belief in Jesus' resurrection.
   c. Muhammad's journey from Mecca to Medina.
   d. The birth of Siddhartha Gautama, the Buddha.

10. Adopting the Gregorian calendar was resisted in areas such as Russia because:
   a. Most people in Russia were not Christians when the Czars ruled.
   b. It was less accurate than the "Years of the Martyrs" calendar.
   c. Areas such as Russia have long winters so they have different solstice dates.
   d. It was seen as Roman Catholic, and resisted by Orthodox leaders.

11. Historically, the numbers we call "Arabic numerals" originated in:
   a. South Asia (India).
   b. The Middle East.
   c. Europe.
   d. Egypt.

12. The last time there was leap-year at the end of the century was in:
   a. 1600 A.D. c. 1800 A.D.
   b. 1700 A.D. d. 1900 A.D.

13. Leap years (of one additional day every fourth year) began with:
   a. George Washington.
   b. Pope Gregory XIII.
   c. Pope John I.
   d. Julius Caesar.

14. The days of the week carry the names of ancient people's:
   a. Weather deities (wind, rain, etc.).
   b. Seasonal gods (spring, fall, etc.).
   c. Solar system gods (Mars, etc.).
   d. Rulers, such as Augustus.

15. The Y2K problem was caused by:
   a. Celebrating the Millennium in 2000 A.D. instead of 2001 A.D.
   b. Defects in the Julian calendar.
   c. Computer program inadequacies.
   d. The negative spiritual force of calendar numbers and years.

16. Who was most concerned about having an accurate calendar during the time of Dionysius?
   a. Peasants, so they would know when to plant crops.
   b. Rulers, so they would know when people's taxes were due.
   c. Astronomers, so they could view the night-time sky accurately.
   d. Religious leaders, to know when to commemorate holy days.

17. Julius Caesar' calendar work was inspired by knowledge he received from:
   a. West Asian Israelite peoples.
   b. North European Germanic peoples.
   c. His subjects who worshiped the sun god, Mithras.
   d. North African Egyptian peoples.

18. Our calendar dates from:
   a. Herod's rule of the Israelite part of the Roman Empire.
   b. The baptism of Jesus (when he received the holy spirit according to Christian belief).
   c. When Jesus first went to Jerusalem.
   d. When, Jesus was crucified.

19. Why do Russian Communists continue to celebrate Lenin's 1917 Communist "Oct. Revolution" in Nov.?
   a. To spite the Czars whom they replaced as rulers.
   b. The Julian calendar was used in Russia until they secured power.
   c. To remove themselves from a calendar based upon religion.
   d. The Russians went back to the Julian calendar when Communists lost control of the government.

20. The major lesson to be learned from this calendar study is that:
   a. Our lives are influenced by the planets whose positions on deeply affect people's lives (astrology).
   b. Our calendar's cosmic significance beyond the solar system.
   c. Specific numbers have associated spirits that can help or hurt us depending upon the rituals we perform (or fail to perform).
   d. Calendars are human-made things reflecting the situations of people who constructed them.